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ABSTRACT

A study was done at Panhandle State University (Oklahoma) examining whether high school grade point averages or ACT (American College Testing) scores provided a better predictor of freshman academic success. Study procedures included a review of the literature, meetings with the academic vice president and five deans, as well as examination of dropout information on the university's 1989-90 year and analysis of information on 170 freshman. Conclusions from the analysis indicated that other factors besides the two scores may have an impact on college grades such as social orientation, age, and student goals at time of enrollment. However, evidence indicated there was a relationship between the high school average, ACT scores and college grades. Analysis of the freshmen in subgroups based on sex and ACT scores revealed that the multiple correlation difference was not large enough to justify the decision to use just one as a single predictor for all subgroups. However, the high school grade average was a better predictor for males and for those with ACT scores above 18. Included are 16 tables, appendixes containing a report of the meeting with the academic vice president, and a report of meetings with the five deans. Also included are 10 references. (JB)

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EVALUATION OF THE FRESHMAN CLASS TO DETERMINE PREDICTORS FOR ACADEMIC SUCCESS AT PANHANDLE STATE UNIVERSITY

Emergence of Higher Education in America Seminar

by

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A Practicum Report presented to Nova University in partial fulfillment of the requirements for the degree of Doctor of Education

Nova University

April, 1992

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Abstract of a Practicum Report Presented to Nova University
in Partial Fulfillment for the Requirements for the
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Evaluation of the Freshman Class to Determine Predictors of Academic Success At Panhandle State University

by

Wayne Manning

April, 1992

The purpose of this practicum was to examine the academic success of the freshman class at Panhandle State University. The problem was that the university did not have a method for collection of information on, or evaluation of, how well freshmen were accomplishing their academic adjustment to college. Further, there were no methods of evaluation established to compare how successful freshmen were as indicated by admission standards and each student's projected potential. Thus, the research question concerned which of the two, high school averages (HSA) or ACT scores, provides a better predictor of overall success at the college level. The answer to this question is important since each faculty member has the responsibility of student advising and needs to know how to predict college success.

Several procedures were used in the assessment. First, a review of the literature was conducted to determine whether and how other institutions of higher learning had evaluated their freshman classes. Several studies were consulted and used in the

evaluation of the freshman class at Panhandle State University. Secondly, a meeting was held with the vice president of academic affairs and the five deans to obtain input for the study. Appropriate study items were compiled, based on the group's recommendations. Also, information on the 1989-1990 Panhandle State University dropout rate was a further consideration used for this study since many students dropout due to a lack of academic success.

A list of 170 freshmen was obtained from the registrar. Their HSA and ACT scores were added to the list. The completed list of freshmen with the appropriate information was sent to the ACT Research Service for evaluation. The analysis was done in terms of the multiple correlations (R) associated with the prediction equations. The multiple correlation is an estimate of the strength of the statistical relationship between a response variable (i.e., course grade) and one or more predictor variables. The value of R ranges from 0 to 1.0. The closer a correlation is to 1.0, the stronger the relationship.

The must significant conclusion derived from the results of this study was the fact that there are other factors besides HSA and ACT scores which may have an impact on college grades. Social orientation, age, and student goals at time of enrollment are a few of these "other factors," although hard to quantify and determine correlational relationships. However, there was sufficient evidence that indicated there is a relationship between ACT scores and high school grades to college GPA.

The vice president of academics and the academic deans recommended evaluating the freshmen class in eight different subgroups. Due to the lack of samples meeting the evaluation criteria, only four of the original subgroups could be evaluated. A complete analysis was conducted on a subgroup of those students with an ACT of 17 and below, students with an ACT of 18 and above, male students, and female students. Also, the overall freshmen class was evaluated.

The summary analysis which evaluated the entire freshman class revealed the multiple correlation difference was not big enough for the decision to use just one, ACT scores or high school grades, as a single predictor for all subgroups. The multiple correlation for subgroup ACT 17 and below and subgroup female revealed that the ACT is the better predictor. The multiple correlation for subgroup ACT 18 and above and subgroup males revealed that high school average is the better predictor.

Recommendations derived from the study included the review and application of this study by all deans and faculty members at Panhandle State University. The findings of this study will be formally presented at the next faculty meeting. Once a thorough understanding is acquired, the faculty member can make use of the findings and give more weight to ACT scores and high school averages in developing student schedules. A final recommendation was that additional studies be conducted on this topic at the post-secondary level since previous studies of this nature were conducted during the 60's and 70's.

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Chapter 1

INTRODUCTION

Background and Significance

At Panhandle State University the freshmAn class historically declines by thirty to fifty percent as the students advance into the sophomore class. In reviewing the last three years, it was discovered that the freshmen class has shown a forty-four percent reduction each year. Many students that drop out do so because of their lack of scholastic achievement, monetary consideration, or possibly relocation. Panhandle State University cannot do anything about their monetary situation or relocation; yet, it is possible to focus on assisting academic success.

Panhandle State University, like most other universities, uses ACT scores as the major entrance requirement. The Panhandle area is compared on a national scale. No relationship either of ACT scores to certain geographical areas or of size of high school attended is incorporated in the entrance requirements. Therefore, it would be extremely helpful to the faculty advisors to compare the perspective students with other students within this geographical area.

Panhandle State University services one of the more sparsely populated areas of Oklahoma, the smallest of the four-year institutions in the state of Oklahoma. Due to its location in

the Oklahoma Panhandle, out-of-state students comprise approximately fifty-five percent of the total enrollment. The result of the large out-of-state enrollment has also created competition for students in the five state area of Oklahoma, Texas, Kansas, Colorado, and New Mexico.

Retention needs to be a by-product of the institution accomplished by the satisfactory delivery of programs and services to students. Panhandle State University, in order to enhance retention, needed to make a concerted effort to help students. The need to help students discover individual talents and then create an environment in which those talents can grow and develop is a must. Retention begins with the office of admissions. A good "fit" between what the student wants and expects and what the university offers should be developed.

Academic advising is a critical factor in retention. Effective academic advising is a part of a student's educational experience designed to help the student in maximizing the resources of and experiences at the university. Academic advising is a campus-wide responsibility. Further, academic advising is attitudinal and clearly states that the university in all its programs and services is here to serve the student.

A large group of students simply do not come back after their freshmen year. The purpose of this practicum, therefore, was to determine which variable(s) or predictor(s) would provide the means for advisors to direct students toward academic success. The president, the vice presidents, and the academic

deans were extremely interested in the identification of ways for increasing academic success for all students. Additionally, the results of the attrition report from the spring semester 1975 through spring semester 1990 indicated the need for campus-wide involvement in promoting academic success for the entering freshmen.

This practicum is related to topics in the Emergence of Higher Education in America Seminar. Among the list of topics in the seminar was accountability and effectiveness required of institutions for higher education of today and the future and how higher education uses the education testing services to decide admission standards, placement, and curriculum. Armed with the knowledge of the students' potential as measured by either high school average or ACT, the faculty will be able to better assist the student toward academic success. What is proposed is that a student who has been advised correctly will have more initiative and motivation to avoid academic problems. Since this practicum was related to concepts taught in the Seminar, it appeared appropriate and feasible.

RESEARCH QUESTION

The central research question was as follows: "Which of the two, high school GPA or ACT scores is a better predictor of overall success at the college level?"

Chapter 2

REVIEW OF THE LITERATURE

A literature search was conducted to investigate if a relationship between ACT scores and high school GPA's to college academic success existed. The primary source for the literature search was the Nova IRS System. It was anticipated that a wealth of information regarding methods to promote academic achievement would be discovered. "Academic Achievement," "Cognitive Ability," "College Students," "Community Colleges," " Expectation," "Grade Prediction," "Predictor Variables," "College Freshmen," and "Predictive Measurement" were descriptors used in an ERIC search for relevant information.

The literature reviewed was arranged so as to present the opinion of experts on the topics of admission testing and high school grades on future academic endeavors as well as describe the findings of others who have studied this problem. The literature review was then reduced to studies that only addressed ACT scores and high school GPA's and the apparent effect on college GPA's.

Opinions of Experts

In the Emergence of Higher Education in America Seminar study guide, Bryant, Kintzer, and Wattenbarger (1990:171) state, "there are always a few students who have not mastered the basic

skills that are required for college level work." Today, universities place most of their emphasis on ACT scores as the indicator of who is prepared for college level work. The use of ACT scores has many implications for the future of all colleges and universities. Because of these implications it becomes imperative to recruit and to retain students with the abilities for academic success.

"...competition for the more academically capable students has become intensified, dependence upon standardized testing in making decisions has also increased (Bryant, Kintzer, and Wattenbarger 1990:181)."

Findings of Other Studies

Many studies have been produced to determine the effect of entrance requirements (testing) on academic achievement. In a Journal of Medical Education, Johnson (1986:629) comments on the validity of the Medical College Admission Test (MCAT). His study discovered that "no differences between men and women were found in the validity of MCAT scores and GPA."

Another study, conducted by Wolf (1983) investigated the predictive value of the high school level battery of tests of General Educational Development (GED) for two-year college academic performance. Wolf's study used a sample of three hundred GED freshmen. Wolf discovered that the GED proved to be a valid predictor of first semester grade point average.

The two studies mentioned on the previous page reflects the predictive value of high school performance and admission testing toward college academic success. Also, the volume of literature revealed by the ERIC request reflects the acceptability of ACT scores and high school grades as predictors for college GPAs.

In favor of predictive value, Thomas (1979:6) states there is evidence that "standardized test scores are not only valuable predictors of college grades for Black students, but in some instances, particularly for black males, may be more predictively valid than high school rank or averages." Another study, conducted by Jex (1966:48), attempted to identify the variable at Utah colleges that gave the most likelihood of academic success. The results are as follows, "the high school average (HSA) is the best single indicator of probable success. Achievement tests of high school work are slightly better than aptitude tests as predictors. Adding a third predictor to HSA's and achievement test scores adds little predictive value."

Jex (1966:48) further adds that breaking down by other subgroups such as "age, family, etc. adds little predictive accuracy." These studies are valid for later use in admissions and counseling. He further believes that, "the optimum combination of HSA and achievement test scores currently represents the practical limits to prediction of college success."

Another study conducted by Fischbach (1990) examined 671 Arts and Science students who were first-time, full-time, degree-

seeking students enroll in fall 1987. A random sample of seventy-five students was selected from each group. Pre-enrollment variables included age, gender, race, American College Testing Program (ACT) score, high school rank and class size, and stated educational goal. Post-enrollment data was obtained from student transcripts. Additionally, a telephone survey of persisters examined self-reported success factors. Findings pertinent to this practicum from Fischbach's study includes:

1. No significant difference was found in persistence rates of vocational and academic program students.
2. Among pre-enrollment variables, only ACT scores, student age, and high school percentile were found to be significantly related to student persistence.
3. Grade point average and course withdrawal rates were the only significant post-enrollment variable.

Specific Studies of ACT and High School GPA's

The literature search also provided the insight as to which test scores and high school grades were best to investigate. According to the Research and Development division of the American College Testing (ACT) Program, English usage, mathematics usage, social studies, and natural sciences test scores along with corresponding high school course grades are recommended. The ACT Research and Development Division state, "the four test scores and four high school grades have been

established as good predictors of academic achievement... The higher these scores, the higher eventual academic achievement in college will likely be."

Duke University, in cooperation with the American College Testing (ACT) service, conducted a research study in 1989 to examine the predictive validity of test scores and other information to admit freshmen. Duke University is a highly selective institution. It receives more than 11,000 applications for admission for approximately 1,500 places in the freshman class. The results of the study were published in November 1990. Of particular interest under this study was determining the statistical relationships among the ACT, SAT and Achievement Tests. They used the same high school course grades and test items as previous mentioned studies.

The findings from the Duke University study provide validation for Duke's admissions rating systems for selection of students. They also suggest that (Summary of Finding, 1990:8)

> ACT assessment scores, in combination with other admissions rating criteria, predict as well or better than SAT scores in combination with other variables, including the admissions rating criteria..., high school rank and self-reported high school grades also proved to be generally less effective predictors than other variables that were examined.

This is not to say that all studies spoke highly of the use of the ACT as a valuable predictor. Nolan (1977) conducted a correlational study using ACT sub-test scores and actual grades earned in corresponding subject areas. Nolan wanted to determine if the ACT was an effective predictor for student's grades at

Southern West Virginia Community College (SWVCC) "correlational analyses yielded coefficients of such low magnitude as to conclude that there is no significant relationship between ACT test scores and academic performance at SWVCC" (1977:6).

Thus, with the exception of one writer, Nolan (1977), the other researchers surveyed in this chapter generally agreed that a relationship existed between ACT scores and high school grades to academic achievement. The intent of this practicum was to determine if a relationship exists between ACT or high school grade averages. The literature review proved not only does this relationship exist, but also that it was highly reliable. In particular, the studies conducted by the ACT Research and Development Division verify this fact. Not merely of the fact that ACT Research and Development Division provides its service, but the fact that most universities accept its findings.

Chapter 3

METHODOLOGY AND PROCEDURES

To complete this evaluation study, four major procedures were utilized. An intensive review of literature on ACT scores and high school grades of entering freshmen was made. The literature review was conducted to determine if certain ACT scores or high school grades can predict success in college grades.

A list of all entering freshmen for the academic year 1990-1991 was obtained from the registrar. For each freshmen, the ACT scores and high school GPA's were reported. Several meetings were held with the registrar to complete required student information.

The next step was to identify what information and which college courses Panhandle State University should evaluate. A meeting was conducted with the academic deans and the vice president of academic affairs. Further, several meetings were held, with selected faculty members, to ensure the focus of the study. Appropriate notes were taken and consulted to ensure useful results of this evaluative study. These notes can be found in Appendix A.

Finally, the list of students, their ACT scores, and their high school grades in identified courses were sent to the ACT Prediction Research Service. Using data-processing methods, ACT

Prediction Research Service generates extensive tables that describe student characteristics and relationships among these characteristics. The analysis was done in terms of the multiple correlations (R) associated with the prediction equations. The multiple correlation is an estimate of the strength of the statistical relationship between a response variable (i.e., course grade) and one or more predictor variables. The value of R ranges from 0 to 1.0. The closer a correlation is to 1.0, the stronger the relationship.

As requested by the reader of the practicum proposal further information is provided as to the nature and outcome of the ACT Research Service. The Research Service supplied the following information:

1. Description of the academic abilities of the entire freshman class.
2. Description of the academic abilities of freshmen enrolling in particular colleges courses.
3. Description of institutional and departmental grading practices.
4. Multiple-regression equations for predicting overall grades and/or grades in various subjects or subject-matter areas using the ACT scores.
5. Relative predictive accuracy for different groups of students.
6. Relative academic abilities of different group of students.

7. Predictive power of locally available test scores or other variables.
8. Comparison of local predictive and descriptive data with data from other participating colleges and universities.

This study was limited to only items one, two, four, and six. The results of the data received from the ACT Research Service was extracted and presented in the tables in Chapter 4.

Definition of Terms

This study involved several key words and concepts meanings specific to this study. Definitions are provided to ensure mutual interpretation of the information given.

Student - is considered a full-time traditional student.

Traditional Student - refers to a student who has progressed from high school directly to college. Usually, eighteen to twenty years old.

Predictor - refers to the equations developed by the Prediction Research Service for predicting the academic performance of future freshmen.

Subgroup - a group of students with like characteristics to be compared to another group.

Limitations

Several limitations to this practicum must be noted. First, no differentiation (i.e., age or sex) in the general evaluation was considered. Specific subgroups that made certain differentiations, but they are identified in the title of the

subgroups. Next, no consideration about the demographics of the freshman class such as, foreign students, non-traditional students, and full-time students with full-time jobs were used in this study. Further, no consideration was given if students failed college courses simply because they failed to withdraw officially and received all failing grades.

Assumptions

Several assumptions were made and must be identified. The first assumption was that every freshman had taken the ACT. In addition, it was assumed that every freshman has taken the appropriate high school courses reported to the research service. The final assumption is that every enrolled freshman has met the institutional criteria for admission to college.

Chapter 4

RESULTS

An extensive review of the literature on predictive research was conducted with particular attention on ACT scores and high school grades as predictors of college academic success for incoming freshmen. The review of the literature revealed that there has been much interest in the topic of predictors to college success. However, it was noted that few recent studies regarding ACT scores and high school grade as predictors to college success have be conducted. According to studies reviewed, it was established that ACT scores and high school grade averages are equitable predictors to evaluate college success.

To begin the study, a meeting was held with the academic deans and the vice president of academic affairs to explain the research services. To ensure that the study would be useful, it was important to obtain the needs of the deans and the vice president of academic affairs. Those involved felt it extremely important that a description of the academic abilities of freshmen enrolling at Panhandle State University would be useful. The deans were interested in the reliability of predicting grades in the student's freshmen year. The deans felt other characteristics could be used in predicting grades for specific courses within their schools.

It was agreed that there was a need to evaluate courses within the general education requirements and not focus on any specific major. Also, it was agreed that specific subgroups needed to be evaluated. The courses recommended:

1. English
2. Mathematics (college algebra).
3. Social Sciences (history, economics, political science, and psychology).
4. Lab Sciences (biology, chemistry, earth science, and animal science).

The academic deans recommended the evaluation of the following subgroups:

1. Subgroup 1: ACT of 17 & Below
2. Subgroup 2: ACT of 18 & Above
3. Subgroup 3: Students 21 years old and older.
4. Subgroup 4: Students 20 year old and younger.
5. Subgroup 5: Male
6. Subgroup 6: Female
7. Subgroup 7: Athletes
8. Subgroup 8: Non-athletes

Two meaningful statistics for enrollment at Panhandle State University included the ACT and completion of the high school core curriculum. In Oklahoma, high school students are required to complete:

1. Four years of English (grammar, composition, literature).

2. Three years of Mathematics (from algebra I, algebra II, geometry, trigonometry, math analysis, calculus).

3. Three years of Social Studies (history including one unit of american history).

4. Lab Science (biology, chemistry, physics, or any lab science certified by the school district. General science, with or without a lab, may not be used to meet this requirement).

Further, each student entering a university in Oklahoma must have a minimum of eighteen in all areas of the ACT. Those students that do not meet the above listed criteria must take developmental courses prior to full acceptance into a bachelor's degree program. Currently, the developmental courses represent approximately two percent of the total student credit hours.

During the 1990 - 1991 academic year, approximately 250 freshmen enrolled at Panhandle State. This study could only include 170 freshmen, since it required populations to meet the criteria for examination. Each population requires at least forty samples that met all established criteria. The established criteria included ACT scores and a grade received in all reported high school classes in English, mathematics, social sciences, and lab sciences.

The State of Oklahoma Higher Education places a great emphasis in the high school core preparation. The high school core describes the minimum courses required for advancement in post secondary education. This practicum also includes an evaluation of the importance of high school core preparation. The results of this research will be extremely helpful to the faculty in their advisory duties. The following tables reflect how successful freshmen are in the below listed categories. The following categories of college courses were reported for evaluation:

1. English
2. Mathematics
3. Social Sciences: (history, economics, political science, and physiology).
4. Lab Sciences: (biology, chemistry, earth science, and animal science).

Table 1 on the following page is comprised of the college grades and academic abilities of the entire freshmen class. According to Table 1, the average ACT composite scores and the average high school grades both reflect reasonable college success.

TABLE 1

College Grades and Academic Abilities

Summary Analysis

Students Enrolled In	Size Of Sample	ACT Comp.	Average Of 4 HS Grades	College GPA
Overall	170	20.1	2.83	2.36

Table 2 reflects the distribution of college grades as they correspond to high school core preparation. High school preparation is defined as four years of English, three years of mathematics, two years of history, and two years of lab sciences.

TABLE 2

Distribution of College Grades By Different Measures of HS Academic Preparation

Summary Analysis

Students With Core Preparation	Student Without Core Preparation
GPA: 2.51	GPA: 2.10

Table 3 reflects the overall college GPA averages and average ACT scores for each high school core curriculum. According to Table 3, the college average GPA and average ACT is greater with the exception of area 1, which is English.

TABLE 3

College GPA And Average ACT Composite

Summary Analysis

	GPA With Core Preparation	AVG ACT COMP	GPA Without Core Preparation	AVG ACT Comp.
1. English	2.09	20.5	2.36	21.5
2. Mathematics	2.79	21.8	2.43	21.4
3. Social Science	2.20	20.1	1.75	19.4
4. Lab Science	2.09	20.2	2.00	19.9

Table 4 reflects the overall distribution of ACT scores of the entire overall freshmen class.

TABLE 4

Distribution of ACT Scores

Summary Analysis

ENG FREQ	ACT Score	MATH FREQ
1	34	0
2	33	0
1	32	0

TABLE 4 (Cont.)

Summary Analysis

ENG FREQ	ACT Score	MATH FREQ
3	31	0
0	30	0
4	29	2
1	28	1
5	27	4
3	26	5
1	25	1
20	24	3
10	23	5
22	22	18
14	21	18
15	20	26
7	19	14
14	18	16
7	17	19
7	16	13
12	15	11
6	14	7
4	13	2
5	12	2
5	11	3
1	10	0
170		170

For this research, the term success refers to grades points average of 2.5-4.0 on a four-point scale. This equates to an alphabetical grade of A's and B's. In general, the other categories of Social and Lab Sciences reflect the same results as English and Math to reduce the amount of data, the distribution tables only include English and mathematics courses.

Table 5 reflects the summary analysis of the entire population to be evaluated. Further, it displays the range of ACT score and observed frequencies of those scores.

TABLE 5

Distribution of High School Grades

Summary Analysis		
Eng. Freq	High School Grades	Math Freq
48	3.5-4.0	40
62	2.5-3.4	58

As mentioned earlier in this chapter, the academic deans recommended the evaluation to include eight subgroups. However, each subgroup must have at least forty samples to be evaluated. After collecting all of the data, four of the subgroups did not meet the criteria for evaluation.[5] Subgroup three (students twenty-one years old and older), four (students twenty years old and younger), seven (athletes), and eight (non-athletes) had to be eliminated.

Table 6 through Table 10 reflect the first two subgroups, those students with an ACT 17 and below and those students with an ACT of 18 and above. Table 6 shows the students with an ACT of 17 and below, and those students with an ACT of 18 and above, average of high school grades for these students, and their GPA's. As could be expected, those students with an ACT 18 and above reflected higher grades in college.

TABLE 6

College Grades And Academic Abilities

Subgroup 1: ACT 17 & Below

Students Enrolled In	Size Of Sample	ACT Comp.	Average Of 4 HS Grades	College GPA
Overall	46	15.8	2.43	1.76

Subgroup 2: ACT 18 & Above

Students Enrolled In	Size Of Sample	ACT Comp.	Average Of 4 HS Grades	College GPA
Overall	131	21.5	2.97	2.56

Table 7 reflects two results of two subgroups. First, the group that accomplished both an ACT of eighteen or above, and second, the high school core preparation that indicates this group was more successful in college.

TABLE 7

Distribution of College Grades By Different Measures of HS Academic Preparation

Subgroup 1: (ACT 17 & Below)	
Students With Core Preparation	Students Without Core Preparation
GPA: 1.97	GPA: 1.53
Subgroup 2: (ACT 18 & Above)	
Students With Core Preparation	Students Without Core Preparation
GPA: 2.70	GPA: 2.46

By reporting the above categories, advisors could use the results to further assist the student in achieving academic success. The results of the evaluation were consistent with one exception as depicted by Table 8 on the following page.

TABLE 8

College GPA And Average ACT Composite

Subgroup 1: ACT 17 & Below

	GPA With Core Preparation	AVG GPA Comp.	GPA Without Core Preparation	AVG ACT Comp.
1. English	1.67	15.7	1.33	16.3
2. Mathematics	3.00	17.0	0.00*	16.0
3. Social Science	1.33	15.3	1.42	15.5
4. Lab Science	2.00	15.7	1.67	15.5

* Insufficient data for evaluation.

Subgroup 2: ACT 18 & Above

	GPA With Core Preparation	AVG GPA Comp.	GPA Without Core Preparation	AVG ACT Comp.
1. English	2.26	21.6	2.55	22.0
2. Mathematics	2.93	22.7	2.62	21.8
3. Social Science	2.48	22.1	1.95	21.5
4. Lab Science	2.23	21.3	2.20	22.7

It was expected that those students with an ACT of 17 and below, without core preparation, would not be as successful in college courses as those prepared, and those with a higher ACT scores. This was generally true, with one exception; that being social science. Those students (ACT 17 & below) without core

preparation were slightly more successful. Further, it was expected that those students with an ACT of 18 and above, without core preparation, would not be as successful in college as those with core preparation. This was also generally true with one exception. The students with an ACT of 18 and higher without core preparation in English was slightly more accelerated in scoring.

Both exceptions may have occurred due to the course scheduling. In both cases, the freshmen enrolled during their second semester. During their first semester, those students took developmental English before enrolling in freshmen level English during their second semester. In the case of social science, those students could have taken courses in recommended succession by Manning (1990), who recommended freshmen students should take political science, history, then economics. Had the students taken political science before economics, it was concluded they would have been more successful.

In the case of English, those students taking developmental English during their first semester and freshmen English the second semester would be better prepared. This would at least support the decision to offer developmental courses.

The primary purpose of this study was to identify the best predictor for college success. To accomplish the purpose, it was necessary to look at individual ACT test scores and high school GPAs to determine which predicts more successfully. This is shown in Table 9 on the next page.

TABLE 9

Distribution of ACT Scores

Subgroup 1: ACT 17 & Below			Subgroup 2: ACT 18 & Above		
Eng FREQ	ACT SCORE	Math FREQ	Eng Freq.	ACT Score	Math Freq.
1	22	1	1	34	0
0	21	1	2	33	0
1	20	1	2	32	0
2	19	2	3	31	0
5	18	6	0	30	0
3	17	9	4	29	2
5	16	6	1	28	1
8	15	8	5	27	5
6	14	5	3	26	5
3	13	2	2	25	1
5	12	2	20	24	3
6	11	3	10	23	6
1	10	0	22	22	17
			14	21	17
46		46	14	20	25
			7	19	13
			9	18	10
			5	17	11
			2	16	8
			4	15	3
			0	14	3
			1	13	1
			131		131

Table 10, on the next page shows the distribution of high school grades for both subgroups 1 and 2. Again, only English and mathematics courses were reported to reduce the amount of data to display. The result of each category was fairly consistent in English, Math, Social and Lab Sciences.

TABLE 10

Distribution of High School Grades

ACT 17 & Below			ACT 18 & Above		
Eng. Freq.	High School Grades	Math Freq.	Eng. Freq.	High School Grades	Math Freq.
2	3.5-4.0	2	48	3.5-4.0	40
18	2.5-3.4	16	46	2.5-4.0	45

To decide which predictor is more effective to judge college success the above tables between subgroup 1 (ACT of 17 & Below) and subgroup 2 (ACT of 18 & Above) shows the following.

1. In the category of ACT 17 and below, the rate of success in high school is forty-three percent, with only two percent having an ACT of 18 or above in English.
2. Continuing in the same category of ACT 17 and below, the high school success is thirty-nine percent, with only 2.7 percent with an ACT of eighteen or above in math.
3. In the category of ACT 18 and above the rate of success in high school was seventy-two percent with ninety percent with an ACT of eighteen or above in English.

4. Further, in the category of ACT 18 and above, the high school success is sixty-five percent with seventy-nine percent, with an ACT of eighteen or above in math.

Table 11 through Table 15 reflect the two subgroups of male students and female students. Table 11 shows both the male and female students' average ACT composite scores, average of high school grades, and average college GPA's. There were no exceptions in either group. Both subgroups were consistent in high school grades and ACT scores. The table below did; however, reflect that the female students did better in all categories.

TABLE 11

College Grades And Academic Abilities

SUBGROUP 5: MALE

Students Enrolled In	Size Of Sample	ACT Comp.	Average Of 4 HS Grades	College GPA
Overall	101	19.9	2.74	2.28

SUBGROUP 6: FEMALE

Students Enrolled In	Size Of Sample	ACT Comp.	Average Of 4 HS Grades	College GPA
Overall	69	20.4	2.96	2.48

Table 12 reflects two interesting results. The first being that both groups did better with high school preparation. Second, the male students with high school preparation did better than female students did with high school core preparation. This speaks well for the requirement for high school core preparation.

TABLE 12

Distribution of College Grades By Different Measures Of HS Academic Preparation

SUBGROUP 5: MALE	
Students With Core Preparation	Students Without Core Preparation
GPA: 2.56	GPA: 2.05
SUBGROUP 6: FEMALE	
Students With Core Preparation	Students Without Core Preparation
GPA: 2.42	GPA: 2.15

Again, by reporting the above categories, faculty advisors could use the results to further assist the student to academic success. The results of the evaluation were consistent with two exceptions as depicted by Table 13 on the next page. Again, the English college GPAs for both subgroups reflect the inconsistency of being higher for those students without high school core preparation.

TABLE 13

College GPA And Average ACT Composite

		SUBGROUP: 5, MALE		
		GPA With Core Preparation	AVG GPA Comp.	GPA Without Core Preparation	AVG ACT Comp.
1.	English	2.08	21.0	2.55	21.5
2.	Mathematics	2.88	21.5	2.56	21.5
3.	Social Science	2.13	20.1	1.56	18.8
4.	Lab Science	2.27	19.6	1.90	19.0
		SUBGROUP: 6, FEMALE		
		GPA With Core Preparation	AVG GPA Comp.	GPA Without Core Preparation	Avg. ACT Comp.
1.	English	2.09	20.0	2.18	21.5
2.	Mathematics	2.67	22.2	2.20	21.6
3.	Social Science	2.30	20.1	1.94	20.1
4.	Lab Science	1.71	21.6	2.17	21.5

Table 14 reflects the distribution of ACT scores for both subgroups in English and mathematics. Again, only English and math were reported. The other two categories are consistent with the English and math categories.

TABLE 14

Distribution of ACT Scores

SUBGROUP 5: MALE			SUBGROUP 6: FEMALE		
ENG FREQ	ACT SCORE	MATH FREQ	ENG FREQ	ACT SCORE	MATH FREQ
0	34	0	1	34	0
1	33	0	1	33	0
1	32	0	0	32	0
2	31	0	1	31	0
0	30	0	0	30	0
2	29	2	2	29	0
1	28	0	0	28	1
2	27	2	3	27	2
2	26	4	1	26	1
0	25	1	1	25	0
9	24	1	11	24	2
4	23	3	6	23	2
13	22	8	9	22	10
11	21	15	3	21	3
9	20	14	6	20	12
3	19	7	4	19	7
8	18	5	6	18	11
4	17	14	3	17	5
4	16	9	3	16	4
9	15	6	3	15	5
4	14	5	2	14	2
3	13	1	1	13	1
3	12	2	2	12	0
5	11	2	0	11	1
1	10	0	0	10	0
101		101	69		69

Table 15 shows the distribution of high school grades. Tables 14 and 15 are used to evaluate which predictor would be more valuable for predicting college success.

TABLE 15

Distribution of High School Grades

SUBGROUP 5: MALE			SUBGROUP 6: FEMALE		
ENG FREQ	HIGH SCHOOL GRADES	MATH FREQ	ENG FREQ	HIGH SCHOOL GRADES	MATH FREQ
25	3.5-4.0	21	23	3.5-4.0	19
32	2.5-3.4	38	30	2.5-4.0	20

To determine which predictor is more effective in judging college success, the above tables between Table 14 and 15, (Subgroup 5 - Male and Subgroup 6 - Female) indicated the following:

1. In the category of Subgroup 5, the rate of success in high school is fifty-six percent with sixty-seven percent with an ACT of eighteen or above in English.
2. Continuing in the same category of Subgroup 5, the high school success is sixty-one percent with fifty-eight percent with an ACT of eighteen or above in math.
3. In the category of Subgroup 6, the rate of success in high school was seventy-seven percent with eighty percent with an ACT of eighteen or above in English.

4. Further, in the category of Subgroup 6, the high school success is fifty-six percent with seventy-four percent with an ACT of 18 or above in math.

In table 16, the results summarized can provide answers to two important questions: How accurately can first-term grades be predicted on our campus? and what are the best predictors?

The interpretive guide to Act Research Services for Higher Education Your College Freshmen states that:

> Since each of the four ACT tests was predictive of college GPA one might surmise that they would provide more accurate prediction singly than in combination. However, because students who score high on one of the ACT tests tend to score high on the others the degree of improvement that results from combining scores is usually not dramatic.

Due to this factor, this study will only evaluate average scores for both ACT and high school grade.

The most pertinent column of Table 16 is headed "College GPA." The correlations given in this column describe the degree to which the four ACT tests and high school averages (HSA) are related to (predictive of) first-term college GPA. A correlation of 1.00 indicates a perfect relationship between the two measures. Knowledge of a student's scores permits perfect prediction of the student's score (or GPA) on the criterion. A correlation of 0.00 indicates that two measures are linearly unrelated.

The multiple correlation of the four tests versus high school averages and the ACT score average with college GPA determines which is a better predictor of college grades. Thus, the average that is greater is the better predictor. Table 16

reflects which of the two Act scores or high school averages is the better predictor.

TABLE 16

Means, Standard Deviations, and Intercorrelations

Of ACT Scores, HSA, and College GPA

Subgroup	College GPA
1. Summary Analysis	
High School Average (HSA)	0.485
ACT Scores (Average)	0.437
The multiple correlation reflect the difference is not big enough for the decision to use just the ACT or the HSA as a predictor. Therefore, both types of measures of developed academic ability (HSA and ACT) contribute to the prediction of college grades for this subgroup.	
2. ACT 17 & Below	
High School Average (HSA)	0.094
ACT scores (Average)	0.254
Multiple correlation: Act scores a better predictor of college grades at Panhandle State University in this subgroup.	
3. ACT 18 & Above	
High School Average	0.541
ACT Scores	0.343
Multiple correlation: HSA is a better predictor of college grades at Panhandle State University in this subgroup.	

TABLE 16 (Cont.)

SUBGROUP	COLLEGE GPA
4. Males	
High School Average	0.535
ACT Scores	0.409
Multiple correlation: HSA is a better predictor of college grades at Panhandle State University in this subgroup.	
5. Female	
High School Average	0.382
ACT Scores	0.470
Multiple correlation: ACT is the better predictor of college grades at Panhandle State University in this subgroup.	

Chapter 5

DISCUSSION, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

Discussion

The results of this practicum were related to the purpose, which was to determine which variable, ACT scores or high school grades, was a better predictor of overall college success. Through a carefully defined process of extracting data and subjecting that data to an appropriate statistical treatment, the question regarding the existence of a relationship between ACT scores, high school grades, and college success was answered. However, it must be noted that the answers, and any conclusions, implications, or recommendations derived from the results must be tempered by the assumptions and limitations cited earlier in this document.

The literature review was related to the purpose of this study in at least three ways. First, it established, through the literature review, that the subject of this study had been a topic of concern and of study for other researchers. There were many studies throughout the past three decades relative to predicting academic performance of its future freshmen.

Second, the literature was helpful because it provided some insight with regard to the kinds of statistics used by

researchers to determine the relationships under examination in this study. All studies reviewed used similar statistical analysis to gain their results. It was reassuring that some of the previous studies concluded and agreed with the result of this practicum. In particular, Prather (1981) study concluded the same results in that high school grades more strongly affect male college GPA's at Georgia State University. Finally, all but one study reviewed determined a correlation to college success from ACT scores and high school grades. In this case the author recommended an alternative instrument (College Qualifying Test or Comparative Guidance and Placement Test) be developed and used.

This practicum focused on the relationship, if it existed, between ACT scores and high school grades to college GPA. There were sufficient evidence that a relationship did in fact exist for the freshmen class Panhandle State University. For example, the summary analysis which evaluated the entire freshman class revealed the multiple correlation difference was not big enough for the decision to use just one, ACT scores or high school grades as a single predictor. The following is the results for each subgroup under study in this practicum:

1. The subgroup for students with an ACT of 17 and below the multiple correlation revealed the ACT scores was a better predictor.
2. The subgroup for students with an ACT of 18 and above the multiple correlation revealed that high school averages was the better predictor.

3. The subgroup Males, the multiple correlation revealed that high school averages was the better predictor.
4. The subgroup Female, multiple correlation revealed that ACT is the better predictor.

Conclusion

The major conclusion derived from the results was that there are other factors that my have implications on college grades, but are hard to quantify. However, there was sufficient evidence that there is a relationship between ACT scores and high school grade to college GPA. Those students who performed with high success on the ACT also performed with high success in college grades.

The literature review was highly supportive of the above conclusion. All but one writer discovered that a relationship existed. The literature review and this study revealed that there is a possibility that high school grades may be slightly inflated.

Implications

Several major implications were drawn from this study. First, an awareness of the factors that contribute to college success is important to an effective retention program. Identifying factors for college success provide appropriate actions to increase student persistence.

Another implication was that the identification of the factors that contribute to college success will aid the faculty advisors in their advisement duties. Also, the knowledge of

which predictor ACT scores or high school grades will assist in the development of the freshman course schedule.

The faculty advisor must keep in mind that high school grades have the tendency to be somewhat inflated. Further, that the ACT is a standardized test that evaluates the students performance according to students outside their respective high school system.

A final implication was uncovered during the literature review. This was that the majority of the studies on this topic were not recent studies. This has the indication that this topic has not been of recent interest.

Recommendation

The following recommendations were made as a result of this practicum:

1. It is recommended that all the Deans of the schools review this study and distribute copies to their faculty members.
2. It is recommended that every faculty member make the students aware of the findings of this study.
3. It is recommended that faculty members give more weight to ACT scores in developing student schedules, although other factors like student social groups can affect academic performance.
4. Finally, it is recommended that similar studies be conducted by other four-year post-secondary institutions. The literature review revealed the majority of the studies were ten years old or older.

REFERENCES

Bryant, Donald W., Frederick C. Kintzer, and James L. Wattenbarger. Emergence of Higher Education in America Study Guide, Nova University, 1990.

Fischbach, Rita. Persistence Among Full-Time Students at Illinois Central College, Evaluate Report, June 7, 1990.

Jex, Frank B. Predicting Academic Success Beyond High School. Journal Announcement: CUMREPT, 48, 1966.

Johnson, Davis G.; and Others. Predicting Academic Performance at a Predominantly Black Medical School. Journal of Medical Education, 61:629-39. August 1979

Manning, Wayne E. Examination of the Relationship Between Academic Classification and the Success in the Macroeconomics Course at Panhandle State University. April 1991.

Nolan, Edwin J. The Relationship Between ACT Sub-Test Scores and Grades Earned: A Correlational Study. Research Report 143:6, April 1977.

"Summary of Findings." ACT/Duke University Cooperative Research Study, November 1990.

Thomas, Charles L. Relative Effectiveness of High School Grades for Predicting College Grades: Sex and Ability Effects. Journal of Negro Education, 48:6-13, Winter 1979.

Wolf, John C. Tests of General Educational Development as a Predictor of 2-Year College Academic Performance. Measurement and Evaluation in Guidance, 16:4-12, April 1983.

"Your College Freshmen." Prepared by the Research and Development Division, The American College Testing Program, Iowa City, Iowa, 1981.

APPENDIX A

REPORT OF MEETING WITH

THE VICE PRESIDENT, ACADEMIC AFFAIRS

MEMORANDUM

March 15, 1991

FROM: Wayne Manning

SUBJECT: ACT Predictive Research Service

On March 15, 1991 I met with the vice president of academic affairs to discuss the practicum that I had undertaken. I explained what the ACT Predictive Research Service was and what it could provide to Panhandle State University. We went on to discuss what information would be of interest and beneficial.

Since the admission office falls under the vice president of academic affairs, determining the relative importance of the ACT scores and High School Grade to college success would be extremely important. He is also responsible for admission requirements; therefore, it would be important to know if the established ACT and high school curriculum requirements are valid.

We discussed the topics that could result from the service. The items discussed were:

1. How successful can perspective student be in the categories of ACT 18 and above and those below ACT of 18.
2. Student Athletics and Non-Athletics. Which category has more success based on ACT and/or high school grades.
3. Another group to be evaluated was traditional verses non-traditional students. Those twenty-five years older verses those students eighteen to twenty-five years old.
4. Which courses would be the most valuable to evaluate.

APPENDIX B

REPORT OF DEAN'S MEETING

MEMORANDUM

March 22, 1991

FROM: Wayne Manning

SUBJECT: ACT Predictive Research Service

During the week of March 18 through 22, 1991 I met with the five Deans of the Schools at Panhandle State University to discuss the practicum that I had undertaken. I explained what the ACT Predictive Research Service was and what it could provide to Panhandle State University. We went on to discuss what information would be of interest and beneficial.

I explained that given the proper information the ACT Predictive Research Service could give the following information:

1. Description of the academic abilities of the entire freshman class.
2. Description of the academic abilities of freshmen enrolling in particular colleges courses.
3. Multiple-regression equations for predicting overall grades and/or grades in various subjects or subject-matter areas using the ACT scores.
4. Relative predictive accuracy for different groups of students.
5. Relative academic abilities of different groups of students.

I further explained that armed with a relative predictive accuracy ACT scores or high school grade for different groups of students would make faculty advisement duties somewhat easier.

The next step needed from each of the deans was what groups of student would they like to evaluate. Also, what courses would they like to evaluate. After much discussion it was decided to evaluate General Education curriculum since all students must take these courses.

1. English
2. Mathematics
3. Social Sciences (History, Economics, Political Science, and Psychology).
4. Lab Sciences (Biology, Chemistry, Earth Science, and Animal Science).

The following subgroups were identified for consideration:

1. Students with ACT 18 and above.
2. Students with ACT 17 and below.
3. Students 21 years old and older.
4. Students 20 years old and younger.
5. Male
6. Female
7. Student Athletes
8. Non-Athletes